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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/874,102	06/05/2001	Thomas H. Baum	272-CIP	6818

7590 12/03/2003

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EXAMINER
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OLSEN, ALLAN W

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 12/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

### Application No.

09/874,102

### Applicant(s)

BAUM ET AL.

### Examiner

Allan W Olsen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Objections*

#### **Claims 9, 10, 21 and 26 are objected to because of the following:**

Claim 9 recites "...wherein the co-reactant is selected from the group consisting of elemental silicon and quartz." Perhaps this should read --...wherein the co-reactant precursor...--, because claim 8 defines the co-reactant as a component of the energized plasma. The elemental silicon and quartz of claim 9 is, presumably, a source of gas phase material that becomes the co-reactant of claim 8 after being energized by the plasma. Claim 26 is objected to for this same reason.

In claim 10, "XF<sub>2</sub>" should be --XeF<sub>2</sub>--.

Claim 21 erroneously recites "...continuing step (c)...".

Appropriate correction is required.

### *Double Patenting*

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

**Claims 1-51 are rejected under the judicially created doctrine of obviousness-type double patenting** as being unpatentable over claims in U.S. Patents Nos. 6,143,191 and 6,254,792. Although the conflicting claims are not identical, they are not patentably distinct from each other. In the event that Applicant

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disagrees and does not file, or indicate that they will file a terminal disclaimer, the examiner will then provide a detailed rationale for this rejection. The claims are also provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims in allowed U.S. Patent Application 09/768,494. This is a provisional obviousness-type double patenting rejection because the conflicting claims, while having been allowed, are not yet patented.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**Claims 1, 2, 4-6, 11-14, 21, 22, 25, 27, 30, 31, 35-38 and 51 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,575,888 issued to Kosakowski et al. (hereinafter, Kosakowski).**

Kosakowski teaches etching Ir with C<sub>2</sub>F<sub>6</sub> or SF<sub>6</sub> (col. 2, lines 29-42). Kosakowski teaches adding O<sub>2</sub> to the plasma (col. 2, lines 29-42, 51-52, col.6, line 25). Kosakowski teaches using a remote plasma (col.2, line 63-64). Kosakowski also teaches using SiF<sub>6</sub> which would inherently generate SiF<sub>2</sub> and SiF<sub>3</sub> radicals when exposed to plasma conditions.

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**Claims 1, 4, 5, 21, and 35-37 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,492,855 issued to Matsumoto et al. (hereinafter, Matsumoto).**

Matsumoto teaches etching platinum with an RF plasma generated from a gas mixture comprising a halide (for example, HBr, SF<sub>6</sub>) and oxygen from SO<sub>2</sub> (column 4, line 44; column 5, lines 1-20).

**Claims 1, 11, 14, 21, 27 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 4,659,426 issued to Fuller et al. (hereinafter, Fuller).**

Fuller teaches etching noble metals with an RF plasma generated from a gas comprising a halogen-containing gas such as CFCI<sub>3</sub> (column 2, lines 48-55). Fuller teaches adding O<sub>2</sub> to the plasma gas (column 4, line 35).

**Claims 49 and 51 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 5,854,104 issued to Onishi et al. (hereinafter, Onishi).**

Onishi teaches a method of plasma etching a metal such as platinum. Onishi teaches using halides such as SF<sub>6</sub> and SiF<sub>4</sub> as plasma gases. Onishi teaches using O<sub>2</sub> in the plasma gas as well (column 4, lines 25-40, column 5, lines 23 – 45).

### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 2, 4-7, 20, 22 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuller.**

The above noted teachings of Fuller are herein relied upon.

Fuller does not explicitly teach etching iridium containing material. Fuller does not teach exciting the reactive gases with RF energy.

It would have been obvious to one skilled in the art to apply the method of Fuller to the etching of iridium containing material because Fuller teaches that the method is generally applicable to refractory metals and Ir is one of a small group of elements known as the refractory metals. It would have been obvious to use RF energy as an excitation source because Fuller teaches an RIE process and it is well known that the conventional means of creating the reactive ions is through the use of an RF discharge.

**Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuller, as applied to claim 2 above, in view of published U.S. Patent Application 2002/00066532 of Shih et al. (hereinafter, Shih).**

Fuller does not teach using a remote microwave plasma.

Shih teaches the etching of Ir with a remote microwave plasma (paragraph [0038]).

It would have been obvious to one skilled in the art to use a remote microwave plasma in conjunction with the method of Fuller because Shih teaches that the that with respect to IR etching, a remote microwave plasma functions as the functional equivalent of the plasma source used by Fuller.

**Claims 11 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto in view of Fuller.**

The above noted teachings of Matsumoto are herein relied upon.

Matsumoto does not teach adding O<sub>2</sub> to the plasma gas.

Fuller teaches adding O<sub>2</sub> to the plasma gas.

It would have been obvious to one skilled in the art to add O<sub>2</sub> to the method of Matsumoto because Fuller teaches that by adding O<sub>2</sub> one obtains control over substrate

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temperature and photoresist erosion and Matsumoto's use of SO<sub>2</sub> demonstrates that no ill effects would be expected upon adding the O<sub>2</sub> as taught by Fuller.

**Claims 40, 41, 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kosakowski.**

The above noted teachings of Matsumoto are herein relied upon.

Kosakowski does not teach using SiF<sub>4</sub> as a source of SiF<sub>2</sub> and SiF<sub>3</sub>.

It would have been obvious to one skilled in the art to use SiF<sub>4</sub> because Kosakowski teaches using SiF<sub>6</sub> which the skilled artisan would recognize as being an equivalent of SiF<sub>4</sub> in terms of plasma reactive species that would be generated upon plasma excitation.

**Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Derwent Acc No 1982-29945D (abstract of JP 56023752) in view of Kosakowski.**

Derwent '45D teaches etching Pt with a halogen containing gas and C<sub>2</sub>H<sub>6</sub>.

Derwent '45D does not teach adding O<sub>2</sub> to the etchant.

Kosakowski teaches adding O<sub>2</sub> to the etchant.

It would have been obvious to one skilled in the art to add O<sub>2</sub> to the Derwent '45D method because Kosakowski teaches that this allows one to control the etching profile.

### ***Allowable Subject Matter***

Except for the double patenting rejection, claims 42-48 are allowable over the prior art of record. Claims 3, 8-10, 17, 18, 26, 29 and 32-34 are also directed to allowable subject matter but in addition to the double patenting rejection, these claims are dependent upon a rejected base claim. Therefore, upon overcoming the double

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patenting rejection these claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

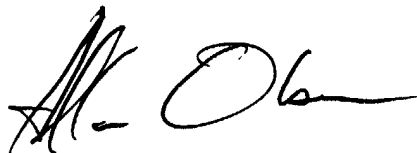
***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 703-306-9075. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Greg Mills, can be reached on 703-308-1633.

The general fax numbers for TC1700 are 703-872-9310 (non-after finals) and 703-872-9311(after-final).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Allan Olsen, Ph.D.  
December 1, 2003

A handwritten signature in black ink, appearing to read 'Allan Olsen', with a stylized 'A' and 'O'.